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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/712,621	11/13/2003	Anil D. Jha	2003P86274US	2148

37462 7590 12/20/2007

LOWRIE, LANDO & ANASTASI, LLP
ONE MAIN STREET, SUITE 1100
CAMBRIDGE, MA 02142

EXAMINER	
DRODGE, JOSEPH W	
ART UNIT	PAPER NUMBER
1797	

NOTIFICATION DATE	DELIVERY MODE
12/20/2007	ELECTRONIC

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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/712,621
Filing Date: November 13, 2003
Appellant(s): JHA ET AL.

Lowrie, Lando & Anastasi, LLP
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed November 6, 2007 appealing from the Office action mailed January 11, 2007.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is substantially correct. Claim 52 was canceled effective with the Amendment filed 11-13-2006.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is substantially correct. Section B should be "Whether claims 51, 53, 54, 62, 65 and 68-70 are anticipated under 35 U.S.C. 102 (b) by Hirayama". Section C should be "Whether claims 62, 65-67 and 70 are anticipated under 35 U.S.C. 102(e) by Willman; argument that Willman is not

applied against claim 68 from which claim 69 depends is persuasive and rejection of claim 69 over Willman has been dropped.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

The following Patents and Published Patent Publication were relied upon by the examiner as evidence in the Final Office Action which is being appealed:

6,461,512	HIRAYAMA	8-2002
6,607,668	RELA	8-2003
6,398,965	ARBA	6-2002
6,733,466	SATO	5-2004
US2004/0118780	WILLMAN	6-2004

Appellant has attached a copy of pages 10-12 of the Amendment under 37 C.F.R. 1.111 filed on January 7, 2005 during the prosecution of the Willman application corresponding to the Willman Patent Publication relied upon by the examiner, as evidence.

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 21-26,40,41,44 and 45 are rejected under 35 U.S.C. 102(e) as being anticipated by Willman et al patent publication US2004/0118780. Willman et al, in the embodiment of figure 4, discloses treatment system, and corresponding method of treating water with such apparatus comprising: point of entry 24, reservoir system (storage tank 26 in combination with reverse osmosis unit 18 and 3-way valve 93), electrochemical device (capacitive deionization module 66 and 70) having a waste stream 72/73 or 81/82, point of use 28 which is fluidly connected and fluidly downstream of the storage tank 26 and auxiliary point of use 104 that is fluidly connected to the waste stream 73 or 82 of electrochemical devices 66 and 70 and downstream thereof, through a recirculation loop, via units 63,68,15,65 and 18 and 3-way valve 93. The ***recirculation loop 62 connects or fluidly connects reverse osmosis unit 18, waste stream 73 or 81 and electrochemical devices 64 and 66, and the intermediate units to downstream auxiliary use 104 by conduits 35,77 and 96.***

For the method claims starting with claim 40, un-desired ion species are removed by the electrochemical device (paragraph 2).

For claims 22 and 41, booster pump 16 provides pressurizing of water flowing through the reverse osmosis unit and storage tank of the reservoir system (paragraphs 16 and 18).

For claims 23-25, see pretreatment stage 12 including carbon filter element 32, with reverse osmosis unit 18 also being upstream of the electrochemical devices 66 and 70 , or in the figure 3 embodiment of electrochemical device 56.

For claim 26, parameter of current control to the electrochemical device is described in paragraph 22, inherently requiring some sort of controller.

Claims 51,53,54, 62, 65 and 68-70 are rejected under 35 U.S.C. 102(b) as being anticipated by Hirayama et al patent 6,461,512.

Hirayama et al disclose reservoir or means for accumulating water 7, point of entry water source 2 or 5, means for pressurizing (pumps P0 and P1, see figure 2a and column 1, lines 24-25,29 and 56-57 , if necessary the water entering upstream tank 1 being "city water" or "well water" is already at some degree of pressure), water being maintained at an elevated pressure of up to 0.5 MPa (or up to 5 atmospheres) being introduced to the compartments of an electrochemical/electrodeionization device 6 (column 4, lines 4-10), heating or heat exchanger means HE1, HE2 and HE3 (column 1, lines 18-30 and 54-55), means for delivering comprising pump P2 and piping (column 4, lines 10-12) and point of use or product water distributing system (column 1, lines 20-31). Column 4, lines 13-18 and figures 1a-2d indicate a distribution system to distribute purified water to a plurality of end use points, with the water being capable of being applied to other various fields and the Example, specifically concerns treatment of feed water of "city water" distributed to occupants of households of the city.

For claim 53, see pretreatment system comprising filter 3 and reverse osmosis membrane 5.

For claims 54 and 62, see means for adjusting electrical current parameter to the electrochemical device at column 4, lines 66-67, and means for adjusting operating temperature parameter at column 3, lines 54-65.

For claim 65, properties such as quantity of bacterial contamination are calculated at column 2, lines 17-21 and lines 39-45.

For claim 68-70, also see heat exchangers HE1, HE2 and HE3 that may maintain heated water to the water treatment during disinfection cycles and optionally also during circulation of the water treatment devices to end use points in water distribution system downstream of the "subsystem" shown in the figures (see column 3, lines 17-21 and 60-65, also figures 1a-2b and column 1, lines 30-31 and column 4, lines 13-20 concerning end use points (water distribution system).

Claims 62, 65-67 and 70 are also rejected under 35 U.S.C. 102(e) as being anticipated by Willman et al patent publication US2004/0118780. Willman et al disclose accumulating water from a point of use (source 24) in a storage tank 26 that is pressurized by way of booster pump 16 and transfer pump 58 (paragraph 16 and 18), to transfer at least a portion of water to electrochemical device 56, providing of electrochemical device (electrodeionization unit 20 and/or 28) to remove undesired ions (paragraph 24), and coupling to a dispensing system via distribution piping or lines to point of use/dispenser 28 or 104 (see especially figures 3 and 4). For claims 62,65,66 and 67, current or power parameter of the electrochemical device is adjusted on a cyclic timed basis by periodically reversing the electric field polarity, as required by monitoring of desired property, level of dissolved ions (paragraph 22).

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Willman et al in view of Rela patent 6,607,668. Claim 26 possibly differs from Willman in requiring explicit recitation of a controller. However, Rela teaches microprocessor and control system for controlling a complex water treatment system including similar components to those of Willman (column 2, line 64-column 3, line 30). It would have been obvious to one of ordinary skill in the art to have adapted the Rela controller to use in the Willman system to optimize treatment of the water in response to changing raw water source parameters, flow rate demands from the downstream points of use.

Claims 27 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Willman et al in view of Sato et al patent 6,733,646. . Claims 27 and 42 differ in requiring the point of use to be a household appliance. Sato teaches use of similar combination of water treatments to those of Hirayama where water may be supplied to household uses (column 1, lines 11-15). It would have been obvious to one of ordinary skill in the art to have utilized the Hirayama treatment system to supply household uses taught by Sato, since many household uses require highly purified water.

Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Willman et al in view of Hirayama et al patent 6,461,512. Claim 28 differs from William in requiring the system to include a heat exchanger. Such heat exchanger is taught by Hirayama beginning with the Abstract and column 2, lines 25-50, in a similar treatment complex, to sterilize the water. It would have also been obvious to have utilized the heat exchanger of Hirayama with the system of Willman to sterilize the water being treated.

Claims 29 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Willman et al in view of Arba et al patent 6,398,965. Claims 29 and 43 differ in requiring use of the treated water in an irrigation system Arba teaches a similar combination of water treatment elements to that of Willman with one application being for medical types of irrigation (column 1, lines 46-54 and column 2,lines 13-22). It would have been similarly obvious to have utilized the Willman apparatus or method for supplying irrigation points of use, as taught by Arba et al, since the Williams system provides highly purified and sterilized water necessary for irrigation requirements.

Claims 63 and 64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirayama et al patent 6,461,512 in view of Sato et al patent 6,733,646. Claims 63 and 64 differ in requiring the point of use to be a household appliance. Sato teaches use of similar combination of water treatments to those of Hirayama where water may be supplied to household uses (column 1, lines 11-15). It would have been obvious to one of ordinary skill in the art to have utilized the Hirayama treatment system to supply household uses taught by Sato, since many household uses require highly purified water.

(10) Response to Argument

The Appellant's Arguments are organized as follows: Ground of Rejection A corresponds to Sections B and C of Argument, Ground of Rejection B corresponds to Sections D, E, F and G of Argument, Ground of Rejection C corresponds to Sections H, I and J of Argument, Ground of Rejection D corresponds to Section K of Argument, Ground of Rejection E corresponds to Section L of Argument, Ground of Rejection F corresponds to Section M of Argument, Ground of Rejection G of Rejection corresponds to Section N of Argument and Ground of Rejection H corresponds to Section O of Argument.

In Section B, it is argued that claims 21-26 cannot be anticipated by Willman in that Willman fails to disclose an auxiliary use fluidly connected downstream of the electrochemical device, or downstream of the waste stream of the electrochemical device. Appellant urges that the waste stream of Willman is discharged to drain 22. Appellant urges that "auxiliary use" as presently claimed refers to providing non-purified water that is by-product waste water from the electrochemical device to an auxiliary use. It is submitted that "waste stream" encompasses the only outlets/outlet conduits 81/82 and 72/73 of the respective electrochemical devices that carry all of the water passing out of the respective devices; the auxiliary use is product dispenser 104 fluidly communicating with the electrochemical devices via recycle loop 62 encompassing conduit 77, units 68,16,65 and 36, 3-way valve 93 and conduit 96. Water passing out of the devices is periodically routed to drain 22, and otherwise flows through the recycle loop back towards use and auxiliary use.

For claims 21-26, it is also argued that Willman does not disclose a reservoir or storage tank being fluidly connected to a point of entry, since Willman discloses an intervening reverse osmosis membrane which is poreless. Appellant states that the membrane of Willman fluidly isolates storage tank from feed water source. Firstly, it is submitted that claiming of components being "fluidly connected" does not preclude there being intermediate units/components, of any kind, "poreless" or otherwise, between water source and storage reservoir; "fluidly connected" is simply interpreted to indicate a fluid path between the 2 connected units. It is clear that water does pass through the reverse osmosis unit 18 en route to the storage tank reservoir from the water source, regardless of relative porosity of the unit.

Appellants continue that Willman fails to disclose an auxiliary use which is "downstream" of the electrochemical device. It is submitted that both 1st use 28 and auxiliary use 104 are downstream of the device, via a flow path for recycling of fluid, recycling not being precluded by the term "downstream".

For claims 22-26, it is further argued that: 1) since Willman discloses a system that utilizes a reverse osmosis unit as a primary treatment stage, this unit cannot also be in a pretreatment stage; 2) there is no teaching that storage tank 26 or its contents are pressurized, pump 16 simply serving to driving the water through the reverse osmosis membrane; and 3) Willman does not inherently require a controller to control polarity of applied electrical potential to the electrochemical device, this being achievable manually. For 1), Willman discloses a plurality of pre-treatment units (carbon filters 32 and 68 and depth filter 30). Also there may be plural reverse osmosis units in series, the first such unit pre-treating water passing to subsequent such units (paragraph 18). For 2), booster pump 16, boosts the pressure through all units and components downstream thereof, the operating pressure obtained in the reverse osmosis device being quite high (up to 1000 psig), inferring that pressure in all system components downstream thereof, including the storage tank and intervening conduits remains elevated (paragraph 18 of Willman). For 3), only claim 26 of the group requires a controller, Rela was relied upon for teaching use of such controller in the system of Willman; although Willman does disclose control of electrical potential polarity of the electrochemical device in paragraph 22.

In Section C, for claims 40,41,44 and 45, it is again argued that Willman does not disclose transferring a portion of discharge water from an electrochemical device to an auxiliary use. Appellant urges that purified permeate water from the reverse osmosis unit is directed to a product dispenser use. Willman does disclose such transferring via a recycle loop as elaborated upon in Arguments pertaining to claims 21-26.

For dependent claims 41,44 and 45, it is urged that Willman does not disclose a method of adjusting an operating parameter of the electrochemical device. In paragraph 22, Willman discloses adjusting or controlling of parameter of applied electrical potential or polarity of the device.

In Section D, with respect to rejection of claims 51,53 and 54 over Hirayama, it is argued that Hirayama fails to disclose any of tanks 1 and 7 accumulating water from a water source at a pressure that is above atmospheric pressure. Appellant urges that tanks 1 and 7 are not necessarily at pressures above atmospheric, because in all embodiments, pumps are disposed to withdraw water from the tanks, such tanks being downstream, not upstream of the tanks. It is responded that the water pressure at each inlet to the electrochemical device 6, that is immediately adjacent and upstream of the tank 7, may be quite elevated (up to about 0.5 MPa, or 5 atmospheres) as a result of applied water pressure from the combination of pumps.

It is also argued that Hirayama does not disclose a water treatment system comprising a household water distribution system, instead providing purified water to pharmaceutical or semiconductor manufacturing. The various figures of Hirayama all show distribution of water to multiple use points; column 4, lines 14-19 disclose producing water for any of various fields of use; "household" does not necessarily represent a structural limitation of the system apparatus claims, if necessary, the Example of Hirayama beginning at column 4, lines 24-27, etc. concern "city water" and "feed water of the above city water" being treated by components of the disclosed system, such city water evidently being available for the entire city that necessarily included households.

For dependent claims 53 and 54, it is argued that Hirayama lacks means for adjusting operating parameter of at least one of electrochemical device, means for accumulating water or household water distribution system. Hirayama discloses adjustment of parameters of temperature and electrical current, a tank for storing water and distribution of water to end uses in various fields, including distribution of "city water", inherently encompassing households.

In Section E, with respect to claims 62 and 65, it is argued that Hirayama fails to disclose a method of treating water comprising accumulating water from a point of entry at a pressure that is above atmospheric pressure. Appellant urges that there is no disclosure of any tanks necessarily accumulating water at a pressure above atmospheric, and that the pumps are all downstream, not upstream, of the tanks, thus the tanks are on the "suction side" of the pumps. It is submitted that the water pressure entering the electrochemical device inlets, just upstream of the tank 7 may be at a quite elevated pressure of up to about 0.5 MPa.

It is further argued that Hirayama fails to disclose adjusting operating parameter of an electrochemical device. It is urged that column 4, lines 52-67 merely describe increasing of temperatures in the electrochemical device while it is idle and being disinfected. Appellant urges that there is no disclosure of any specific operator parameter being adjusted, much less how such parameter is adjusted or responsiveness to input signals. The claims do not require any particular form of adjusting or control of parameters. Hirayama teaches to adjust both temperatures and pressures of the electrochemical device. If necessary, "operating parameter" is broad enough to read on control of parameters during cleaning/sterilization cycles for the device.

For dependent claim 65, appellant argues that Hirayama does not disclose calculating a desired property of the water. Column 3, lines 63-65 and column 4, lines 63-64 concern specific rates of temperature adjustment, or calculated changes in temperature per unit of time.

In Section F, with respect to rejection of claims 68 and 69 over Hirayama it is argued that Hirayama fails to disclose a pressurized fluid reservoir, or pressurizing of any tanks. It is urged that pumps are fluidly connected downstream of the tanks, with their upstream suction sides directly connected to the tanks, thus not supporting assertions that the tanks accumulate water at above atmospheric pressure. Again, it is submitted that the water pressure entering the electrochemical device inlets, just upstream of the tank 7 may be at a quite elevated pressure of up to about 0.5 MPa.

In Section G, regarding anticipation of claim 70 under Hirayama, it is again argued that Hirayama does not disclose a pressurized reservoir system, in that pumps are fluidly connected downstream of the tanks. It is further asserted that such pumps are utilized to facilitate delivery of water to downstream unit operations. It is urged that fluid flow would not occur without the pumps, thus leading to a conclusion that the fluid in the tanks is not pressurized. Again, it is submitted that the water pressure entering the electrochemical device inlets, just upstream of the tank 7 may be at a quite elevated pressure of up to about 0.5 MPa. Additionally, reliable supply of purified water to the end use points would require the circulating water to be maintained at positive pressures upstream.

In Section H, regarding rejection of claims 62 and 65-67 over Willman, it is argued that Willman discloses neither of accumulating water from a point of entry at a pressure that is above atmospheric pressure or adjusting at least one operating parameter of an electrochemical device. It is urged that Willman does not state that the tank is pressurized or explain why the storage tank must necessarily accumulate water from a point of entry at a pressure that is above atmospheric pressure. Again, it is submitted that the water pressure entering the electrochemical device inlets, just upstream of the tank 7 may be at a quite elevated pressure of up to about 0.5 MPa. Additionally, reliable supply of purified water to the end use points would require the circulating water to be maintained at positive pressures upstream. Again, parameters of both temperature and electrical current are adjusted.

In Section I, with respect to rejection of claim 69 over Willman, it is indicated that as a matter of law, Willman cannot anticipate dependent claim 69, since independent claim 68 has not been anticipated by Willman. This is persuasive and rejection of claim 69 over Willman has been withdrawn. However, claim 69 remains rejected over Hirayama.

In Section J, with respect to rejection of claim 70 over Willman, it is argued that Willman does not explain why the storage tank must necessarily be pressurized, or pressurizable, presence of upstream booster pump being insufficient. Paragraph 18 of Willman teaches the reverse osmosis unit(s) just upstream of storage tank 26 being at quite elevated high pressures of up to about 1000 psig, thus necessarily also pressurizing water to points downstream of the tank. As with Hirayama, also reliable supply of water to dispensing uses necessarily requires water upstream as in the storage tank maintained at positive pressure.

In Section K, with respect to rejection of claim 26 over Willman in view of Rela, it is maintained that since Willman does not anticipate claim 21 concerning auxiliary use fluidly connected to waste stream from electrochemical device, claim 26 is necessarily patentable. Teachings of Willman relative to claim 21 and associated arguments have previously been addressed.

In Section L, with respect to rejection of claims 27 and 42 over Willman in view of Sato, it is further argued that neither Willman or Sato provides treated water to an appliance or household, or household use such as in irrigation. Appellants urge that Sato teaches providing of ultra-pure water which would not be suitable for household use since requirements therefor differ greatly than for the high purity water provided by Willman. Appellants further maintain that the ultra-pure water provided by Sato would be extremely corrosive and would corrode the conventional household water distribution system. Willman discloses dispensing faucets (paragraph 15) which are a form of appliance. Sato explicitly teaches that electrodeionization units, as in Willman, can provide water not only for industrial uses but also for "households" (column 1,lines 10-17).

In Section M, with respect to rejection of claim 28 over Willman in view of Hirayama, it is again argued that Willman does not disclose auxiliary use fluidly connected to waste stream from an electrochemical device. With regard to incorporating the heat exchanger of Hirayama in the system disclosed by Willman, it is argued that Hirayama requires separate heat exchangers prior to reverse osmosis device and prior to electrodeionization device since the latter cannot tolerate elevated temperatures. Appellants urge that if the Willman system were modified to include the heat exchanger or Hirayama, damage to the electrodeionization device would occur, as it is directly coupled to the reverse osmosis membrane in Willman instead of being separated by intermediate unit operations. Appellants also urge that one of ordinary skill would not have modified the Willman system by heating the storage tank, as in Hirayama, since Hirayama only heats storage tank water to effect disinfection of unit operations; there being no unit operations downstream of the Willman storage tank. Hirayama and Willman commonly circulate purified water and water being purified in circulation loops employing reverse osmosis filters, storage tanks and electrodeionization units. Column 3, lines 60-64 of Hirayama urge option of temperatures being maintained at mildly elevated levels during actual operation of the electrodeionization unit for water production, not merely during sterilization.

In Section N, with respect to rejection of claims 29 and 43 over Willman in view of Arba, it is further argued that Arba does not teach the auxiliary use being an irrigation system, in the context of a household irrigation system for irrigating vegetation. Appellants further urge that the water produced by Willman would not be suitable, or sufficiently pure, for the form of irrigation (medical irrigation of tissue) taught by Arba. These claims do not specify the type of "irrigation". Willman discloses production of water of sufficient quality for use in "laboratories" such as medical laboratories, which has similar high standards of purity to that required by medical irrigation.

In Section O, with respect to rejection of claims 63 and 64 over Hirayama in view of Sato, in addition to repetition of arguments concerning whether Hirayama anticipates independent claim 62, it is further argued that the Hirayama process, could not be applied to providing water for household use, since deionizing of the water is not taught by the references. Again, Hirayama does disclose production/purifying of city water, generally, or water for various fields. Both references explicitly disclose deionizing in multiple locations; Sato teaches that deionizing of water from electrodeionization units such as in Hirayama can be variously used for forms of industry requiring highly purified water, and also for household use (column 1,lines 10-18).

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Joseph Drodge

Primary Examiner, Art Unit 1797

/Joseph Drodge/

Primary Examiner, Art Unit 1797

Conferees:

/David R. Sample/

David Sample

Supervisory Patent Examiner, TC 1700

/Jennifer Michener/

Jennifer Michener

Quality Assurance Specialist, TC1700